

## **2 SOURCES OF GROUNDWATER DATA**

The following sections describe the primary hydrogeologic references for each of the sites examined for this investigation. Data from these reports were used to prepare the summary graphics described later in this report. Portions of these reports have been selected for inclusion in this report as appendices to make the information readily available.

### **2.1 Regional Hydrogeology**

The primary hydrogeologic references that describe the regional hydrogeology are:

Poland, J. F., Garrentt, A. A., and Sinnott, A., 1959, Geology, Hydrology, and Chemical Characteristics of the Ground Waters in the Torrance-Santa Monica Area, California, USGS Water Supply Paper 1461.

State of California, Department of Water Resources, 1961, Planned Utilization of the Ground Water Basins of the Coastal Plain of Los Angeles County. Appendix A Ground Water Geology.

James M. Montgomery Consulting Engineers, Inc., 1992, Final Report on the West Coast Basin Plume Mitigation Study. August 1992.

Watermaster Services in the West Coast Basin of Los Angeles County, July 1, 1998 June 30, 1999. September 1999.

### **2.2 BRC Former Boeing C-6 Facility**

The primary hydrogeologic references for the Site document the hydrostratigraphic units present at the Site and construction of groundwater monitoring wells. They include:

Woodward Clyde Consultants, 1990, Douglas Aircraft Company, Torrance (C6) Facility Phase III Groundwater and Soil Investigation Report.

Woodward Clyde Consultants, 1992, Report on the Installation of Observation Wells WCC-11 and WCC12 at Douglas Aircraft Company's Facility in Torrance California.

Kennedy/Jenks Consultants, 1999, Installation of Temporary Monitoring Wells Area Buildings 1 and 2.

Kennedy/Jenks Consultants, 2000, Installation of Temporary Monitoring Wells TMW-10 through TMW-16 and 2<sup>nd</sup> Quarter (March/April) Groundwater Monitoring Results.

TRC, 1999, Groundwater RCRA Facility Investigation Report, Former International Light Metals Facility, Torrance, California, Volumes I and II. (Including BL-1 through BL-8).

A total of 40 wells have been drilled at the Site since 1987. WCC wells were drilled between 1987 and 1992 and have been regularly sampled, some as many as 34 times. TMW wells were installed in mid 1998 and early 1999 and have been monitored three to 6 times. BL wells were installed in early 1999 as a cooperative

effort between Boeing and Lockheed and were monitored at least two times. Table 2-1 summarizes the monitoring events for the Site, the former ILM site and the Del Amo Study Area.

Groundwater flow directions, changes in water levels, and water quality variations for the Site are documented in a series of groundwater monitoring reports that were prepared for monitoring events that occurred between June 1992 and June 2000. Typically, water samples collected from the wells were analyzed for Volatile Organic Compounds (VOCs) by EPA method 8260, and for selected metals by metal appropriate EPA methods.

### **2.3 Site Vicinity Conditions**

Groundwater conditions in the vicinity of the Site are described by the results of several large-scale, long-term groundwater investigations that are being conducted on adjacent and nearby properties:

- International Light Metals
- Montrose Chemical
- Del Amo Site.
- Other Del Amo Study Area Sites

The Del Amo site and the Montrose site are unrelated Superfund sites located in close proximity to each other (Figure 2-1). This physical proximity and the major dissolved-phase VOC plumes that are commingled in the aquifers beneath the sites have caused the US EPA to designate the area a "Joint Site." for the purpose of remediation. Other smaller sites that may also contribute to groundwater plumes in the area are also included in the Del Amo Study Area. The intensity of groundwater investigations in the area is illustrated by the large number of wells shown on Sheet 1.

#### **2.3.1 International Light Metals**

International Light Metals (ILM) is located immediately west of the Site (Figure 2) and covers approximately 67 acres. The primary hydrogeologic reference for the former ILM site is:

TRC, 1999, Groundwater RCRA Facility Investigation Report, Former  
International Light Metals Facility, Torrance, California, Volumes I and  
II.

ILM was an industrial metals processing facility that began operations around the beginning of World War II and continued in operations until August 1992. The former facility operated under a RCRA Part-A permit and a DTSC Hazardous Waste Facility permit. The former facility was removed and the site is currently being redeveloped. Large warehouse/distribution buildings now cover most of the former site. California Department of Toxic Substances Controls performs environmental oversight of soil and groundwater investigations at the former ILM site.

### **2.3.2 Del Amo Study Area - Del Amo Site**

The Del Amo Site is located within the Del Amo Study Area. The primary hydrogeologic references for the Del Amo Study Area include:

Dames & Moore, 1997, Groundwater Monitoring Report, Third Sampling Period 1996 and First Sampling Period 1997. Del Amo Study Area, Los Angeles, California.

Dames & Moore, 1998, Final Groundwater Investigation Report, Del Amo Study Area, Los Angeles, California.

Additional information regarding site conditions and regulatory agency response to the site are included in:

US EPA 1999, Record of Decision for Dual Site Groundwater Operable Unit, Montrose Chemical and Del Amo Superfund Sites, Volume I and II.

Additional information regarding the hydrogeology of the Del Amo site may also be present in reports that describe the results of hydrogeologic modeling within the Del Amo Study Area. These reports are listed in US EPA (1999).

The following abbreviated description of operations at the Del Amo Site was edited from a description presented in US EPA, 1999.

The former United States War Assets Administration (USWAA) owned a synthetic rubber manufacturing facility in Harbor Gateway beginning in 1942. USWAA entered into operating agreements with Shell Oil Company (Shell), Dow Chemical Company, and several other companies, to produce synthetic rubber during World War II. In 1955, Shell purchased the facility and began operating it directly. Shell operated the facility until 1972, at which time operations ceased, the plant was dismantled, and the plant buildings were razed. The site has been entirely redeveloped with light industrial and commercial enterprises, with the exception of the area at the south-central border of the former plant property, known as the "Del Amo Waste Pits."

The former Del Amo synthetic rubber plant property covered approximately 270 acres. Two sub-plants produced styrene and butadiene. The third sub-plant chemically combined styrene and butadiene to make synthetic rubber. There is a minimum of eleven areas at the former Del Amo plant that are under investigation as sources of benzene NAPL to the subsurface. These areas remain under further investigation by Shell Oil Company and Dow Chemical Company under the oversight of US EPA.

Other sources of contamination at the former Del Amo site are the unlined "waste pits," in which both tarry and aqueous wastes were discharged, including wastes containing benzene, ethylbenzene, and naphthalene and surfactants. The pits have a thick soil cover, over 55,000 cubic yards of viscous waste. Under a ROD signed by the US EPA, an engineered impervious cap complying with RCRA will be constructed over the waste and soil vapor extraction (SVE) will be performed on the soils under the waste.

Other sources of VOCs are present at the former Del Amo Site. These are described in more detail in US EPA (1999).

### **2.3.3 Del Amo Study Area - Montrose Chemical**

The Montrose site is located within the Del Amo Study area. Although site-specific groundwater investigations were performed at the Montrose site prior to EPA's designation of a joint site, the Del Amo Study Area reports provided a more concise summary than would have otherwise been available. Reports prepared for the Del Amo Study Area are the primary hydrogeologic references used for the Montrose site including:

Dames & Moore, 1997, Groundwater Monitoring Report, Third Sampling Period 1996 and First Sampling Period 1997. Del Amo Study Area, Los Angeles, California.

Dames & Moore, 1998, Final Groundwater Investigation Report, Del Amo Study Area, Los Angeles, California.

Additional information regarding site conditions and regulatory agency response to the site are included in:

US EPA 1999, Record of Decision for Dual Site Groundwater Operable Unit, Montrose Chemical and Del Amo Superfund Sites, Volume I and II.

Additional information regarding the hydrogeology of the Montrose site may also be present in reports that describe the results of hydrogeologic modeling within the Del Amo Study Area. These reports are listed in US EPA (1999).

The following description of operations at the Montrose site was edited from a description presented in US EPA, 1999.

Montrose operated a technical grade dichloro-diphenyltrichloroethane (DDT) pesticide manufacturing plant at the site from 1947 to 1982. The site is about 13-acres in size. DDT was used in the United States until 1972, when the use of DDT was banned in the United States for most purposes. After 1972, Montrose continued producing DDT for export. In 1982-1983, the plant ceased operations, was dismantled, and all buildings were razed. Since 1985, a temporary asphalt covering has been present over the site, which is otherwise fenced and vacant.

The primary raw materials Montrose used for making the pesticide DDT were chlorobenzene trichloroacetaldehyde, and a sulfuric acid catalyst called oleum. Raw materials were mixed in batch reactors to produce DDT. Chlorobenzene and DDT are two of the primary contaminants found in the environment at the Montrose site. Also present is an unwanted by-product of DDT production, para-chlorobenzene sulfonic acid, or pCBSA. pCBSA is highly water-soluble and appears to be associated only in connection with the manufacture of DDT. There are no promulgated health standards for pCBSA, which is found extensively in groundwater at the Montrose and Del Amo Superfund Sites.

Releases at Montrose appear to have been from trenches used to convey wastes and a waste disposal pond that received DDT, chlorobenzene wastewaters, caustic liquors and acid tars. The soil under the Central Processing Area of the former Montrose plant also contains large quantities of chlorobenzene in DNAPL form, as well as chlorobenzene dissolved in groundwater. The DNAPL occurs both above and below the water table. Data collected during the remedial investigation suggest that this DNAPL is a primary continuing source of groundwater contamination. There were also periodic discharges of

contamination from the Montrose plant into the storm water pathway leading from the Montrose plant.

#### **2.3.4 Del Amo Study Area - Other Sites**

There are other recognized sources of contamination within the Del Amo Study Area. Additional detailed studies for these Sites were not identified or examined.

The following descriptions of other sites in the Del Amo Study Area were edited from a description presented in the ROD (US EPA, 1999). Figures referenced in this section are included in a portion of the ROD reproduced in Section G.

Within the Del Amo Study Area, there are several actual or potential sources of benzene and chlorinated solvents in addition to those identified at the former Montrose site and former Del Amo site. The sources described in the paragraphs below were identified in the ROD for background information only. US EPA (1999) notes that there may be other sources. The sources are listed below with the likely primary contributing contaminant in parentheses "( )." Other contaminants may also be present.

**Petroleum transmission pipelines (benzene).** A series of petroleum transmission pipelines, unrelated to the former Montrose and former Del Amo sites, have been and still are used to transfer petroleum products from the port to the refineries in the area (See ROD in Appendix F Figure 2-3 a, Items "K," "M," and "N"). There are several locations directly under these pipelines where groundwater concentrations are indicative of the likely presence of benzene NAPL and which may be related to these pipelines. The pipelines occur in separate bundles. Most of these bundles run in an east-west direction just south of both the former Montrose and former Del Amo sites. One suspect location along this pipeline is south of the Montrose site along the pipeline, and east of the Jones Chemicals facility (See below for discussion of Jones Chemical). Another bundle is a feeder line that runs in a north-south direction into the east-west transmission line, parallel to Berendo Avenue south of the former Del Amo site. Petroleum NAPL containing benzene has been directly observed along this feeder line near historical groundwater monitoring well P-1.

**Stauffer Chemical (benzene).** A potential source of benzene in groundwater near the former Montrose site is Stauffer Chemical, which historically operated a chemical plant on the Montrose site that manufactured benzene hexachloride (BHC), another pesticide.

**Montrose (benzene).** A potential source of benzene in groundwater near the former Montrose site is the benzene that occurred in raw chlorobenzene, most likely at a rate of less than 1%. Because of the copious quantities of chlorobenzene released, this could account for some of the benzene contamination in groundwater.

**The Jones Chemicals, Inc. (TCE, PCE, DCE, and benzene).** This plant manufactures bleach and sells other chemical products in bulk. The plant has been in operation immediately south of the former Montrose site since the mid-1950s (See ROD in Appendix F, Items "J" and "L" on Figure 2-3 a). Based on investigations by EPA and the State of California, Jones Chemicals, Inc. is known to have discharged chlorinated solvents to a dry well on their property. Likewise, there are fuel tanks that may have leaked petroleum products into the subsurface. Jones also stored PCE on its property in bulk, packaged PCE in drums, and sold PCE for a number of years. Jones also operated a drum washing facility that was also a likely source of chlorinated aliphatic solvents released to the subsurface.

**Solvent-handling Facilities** (TCE, PCE). There are facilities near 196th Street at the western border of the former Del Amo plant which have handled chlorinated solvents and have soils with significant concentrations of these solvents (See ROD in Appendix F, Item No.2 on Figure 2-3a; also shown on Figure 2-3b). The operations at these facilities occurred or continue to occur subsequent to the closure of the Former Del Amo plant.